

CLAIMS

What is claimed is:

- 1 1. A nose sprocket adapted for engagement with a cutting chain drive tang,
2 comprising:
 - 3 an inner race having a first diameter and a perimeter;
 - 4 a plurality of bearings positioned about the perimeter of the inner race;
 - 5 an outer race having an inner bore with a second diameter sized such that the
6 outer race is rotatably disposed about the inner race and bearings, the outer race
7 having an outer periphery;
 - 8 a plurality of teeth formed in the outer periphery, the plurality of teeth each
9 having a leading edge and a trailing edge, the leading and trailing edges of the
10 plurality of teeth each having a lower portion and an upper portion;
 - 11 a gullet defined between the leading edge of one of the plurality of teeth and
12 the trailing edge of an adjacent one of the plurality of teeth; and
 - 13 a relief in the upper portion of the leading and trailing edges such that the
14 drive tang is urged to contact the lower portion of the plurality of teeth.
- 1 2. The nose sprocket of Claim 1, wherein the relief further comprises:
 - 2 a first angle formed between a center line bisecting the gullet and the lower
3 portion; and
 - 4 a second angle formed between the center line and the upper portion, the
5 second angle being greater than the first angle.
- 1 3. The nose sprocket of Claim 1, wherein the relief further comprises:
 - 2 a first angle formed between a center line bisecting the gullet and the lower
3 portion; and
 - 4 a second angle formed between the center line and the upper portion, the
5 second angle being substantially equal to the first angle, and the upper portion being
6 inset a predetermined distance away from the center line.

1 4. The nose sprocket of Claim 1, wherein the relief causes the drive tang to be
2 supported at the lower portions and thus provides increased resistance to splitting at
3 the gullet to enable increasing the inner bore diameter and increasing the radial
4 dimension of the inner race while maintaining a predetermined circuitous path
5 around the nose end.

1 5. The nose sprocket of Claim 1, wherein the relief causes the drive tang to be
2 supported at the lower portions and thus provide increased resistance to splitting at
3 the gullet such that operational life of the nose sprocket can be prolonged.

1 6. A guide bar, comprising:
2 elongated opposed side walls;
3 a perimeter edge;
4 a groove disposed about a substantial portion of the perimeter edge;
5 a nose end, the nose end having a nose sprocket disposed between the
6 opposed side walls, the nose sprocket further comprising:
7 an inner race having a first diameter, the inner race being fixed between the
8 opposed side walls;
9 a plurality of bearings positioned about the perimeter of the inner race;
10 an outer race having an inner bore with a second diameter sized such that the
11 outer race is rotatably disposed about the inner race and bearings, the outer race
12 having an outer periphery;
13 a plurality of teeth formed in the outer periphery, the plurality of teeth
14 having a leading edge and a trailing edge, the leading and trailing edges of the
15 plurality of teeth each having a lower portion and an upper portion;
16 a gullet defined between the leading edge of one of the plurality of teeth and
17 the trailing edge of an adjacent one of the plurality of teeth; and
18 a relief in the upper portion of the leading and the trailing edges such that a
19 drive tang is urged to contact the lower portion of the plurality of teeth.

1 7. The guide bar of Claim 6, wherein the relief further comprises:

2 a first angle formed between a center line bisecting the gullet and the lower
3 portion; and

4 a second angle formed between the center line and the upper portion of one
5 of the plurality of teeth, the second angle being greater than the first angle.

1 8. The guide bar of Claim 6, wherein the relief further comprises:

2 a first angle formed between a center line bisecting the gullet and the lower
3 portion of one of the plurality of teeth; and

4 a second angle formed between the center line and the upper portion, the
5 second angle being substantially equal to the first angle, and the upper portion being
6 inset a predetermined distance away from the center line.

1 9. The guide bar of Claim 6, wherein the relief causes the drive tang to be
2 supported at the lower portions and thus provides increased resistance to splitting at
3 the gullet to enable increasing the inner bore diameter and increasing the radial
4 dimension of the inner race while maintaining a predetermined circuitous path
5 around the nose end.

1 10. The guide bar of Claim 6, wherein the relief causes the drive tang to be
2 supported at the lower portions and thus provide increased resistance to splitting at
3 the gullet such that operational life of the nose sprocket can be prolonged.

1 11. A nose sprocket adapted for engagement with a cutting chain drive tang,
2 comprising:

3 an inner race having a first diameter and a perimeter;

4 a plurality of bearings positioned about the perimeter of the inner race;

5 an outer race having an inner bore with a second diameter sized such that the
6 outer race is rotatably disposed about the inner race and bearings, the outer race
7 having an outer periphery;

8 a plurality of teeth formed in the outer periphery, each of the plurality of
9 teeth having an abbreviated leading edge, an abbreviated trailing edge and a tip; and

10 a gullet defined between the abbreviated leading edge of one of the plurality
11 of teeth and the abbreviated trailing edge of an adjacent one of the plurality of teeth,
12 the gullet having radius of curvature greater than a conventional radius of curvature
13 that would be formed if the leading edge and trailing edge were not abbreviated,
14 such that the drive tang is urged to contact the lower portion of the abbreviated
15 leading and trailing edges of the plurality of teeth.

1 12. A guide bar, comprising:
2 elongated opposed side walls;
3 a perimeter edge;
4 a groove disposed about a substantial portion of the perimeter edge;
5 a nose end, the nose end having a nose sprocket disposed between the
6 opposed side walls, the nose sprocket further comprising:
7 an inner race having a predetermined diameter and a perimeter;
8 a plurality of bearings positioned about the perimeter of the inner race;
9 an outer race having an inner bore with a second diameter sized such that the
10 outer race is rotatably disposed about the inner race and bearings, the outer race
11 having an outer periphery;
12 a plurality of teeth formed in the outer periphery, each of the plurality of
13 teeth having an abbreviated leading edge, an abbreviated trailing edge and a tip; and
14 a gullet defined between the abbreviated leading edge of one of the plurality
15 of teeth and the abbreviated trailing edge of an adjacent one of the plurality of teeth,
16 the gullet having radius of curvature greater than a conventional radius of curvature
17 that would be formed if the leading edge and trailing edge were not abbreviated.

1 13. The guide bar of Claim 12, wherein the relief causes the drive tang to be
2 supported at the lower portions and thus provides increased resistance to splitting at
3 the gullet to enable increasing the inner bore diameter and increasing the radial
4 dimension of the inner race while maintaining a predetermined circuitous path
5 around the nose end.

1 14. The guide bar of Claim 12, wherein the relief causes the drive tang to be
2 supported at the lower portions and thus provide increased resistance to splitting at
3 the gullet such that operational life of the nose sprocket can be prolonged.

1 15. A cutting chain adapted for engagement with a nose sprocket having a
2 plurality of teeth, comprising:

3 a plurality of interconnected links, the plurality of interconnected links
4 including cutting links and drive links; and

5 the drive links having a drive tang that is adapted to engage a gullet formed
6 in the nose sprocket, the drive tang having an upper portion and a lower portion and
7 a leading edge and a trailing edge, the leading edge and the trailing edge being
8 inwardly relieved at the upper portion.

1 16. The cutting chain of Claim 15, wherein the inwardly relieved portions cause
2 the drive tang lower portions to contact the plurality of teeth at a correspondingly
3 lower portion and thus provides increased resistance of the nose sprocket to failure.

1 17. A guide bar adapted receiving a saw chain of interconnected links, certain
2 ones of which include a drive tang having a leading and trailing edge which
3 provides entrainment of the saw chain on the guide bar as the saw chain is driven
4 around the guide bar, the guide bar, comprising:

5 a nose portion, including spaced-apart side walls and a nose sprocket secured
6 between the side walls;

7 the nose sprocket, including an inner race fixedly secured to the side walls,
8 an outer race surrounding the inner race, and bearings between the inner and outer
9 races and permitting rotation of the outer race relative to the inner race;

10 sprocket teeth formed on the periphery of the outer race, the teeth having
11 leading and trailing edges;

12 a gullet formed between adjacent teeth, and a minimum web thickness of the
13 outer race formed at the gullets where splitting or breakage of the outer race most
14 commonly occurs;

15 the leading and trailing edges and the gullets formed there between adapted
16 to receive the drive tangs of the saw chain for supporting the saw chain as the saw
17 chain traverses the nose portion of the guide bar in a predetermined circuitous path;

18 the leading and trailing edges and the gullet configured to form generally a
19 v-shape, the leading and trailing edges including an upper edge portion and a lower
20 edge portion, the v-shape cooperatively configured relative to the drive tangs of the
21 saw chain whereby the supporting contact of the tangs by the leading and trailing
22 edges occurs at the lower edge portions and the gullet; and

23 wherein the support of the drive tangs at the lower portions provide
24 increased resistance to splitting at the web width to prolong the life of the nose
25 sprocket or enable decreasing the web width and increasing the radial dimension of
26 the inner race while maintaining the predetermined circuitous path around the bar
27 nose.

1 18. The guide bar of Claim 17, wherein an upper portion of the drive tang edges
2 is inwardly relieved away from the corresponding adjacent sprocket tooth leading or
3 trailing edge, the corresponding support for the drive tang thus being provided by
4 the lower edge portion of the corresponding leading edge and trailing edge portions
5 of the sprocket teeth.

1 19. The guide bar of Claim 17, wherein the upper portion of the leading and
2 trailing edges of the teeth are inwardly relieved away from the corresponding drive
3 tang edge such that the corresponding support for the drive tang is provided by the
4 lower edge portion of the leading and trailing edges of the teeth.

1 20. The guide bar of Claim 18, wherein the lower edge portions are abbreviated
2 such that the gullet is defined as an expanded bowl shape of increased diameter at
3 the bottom of the v to thereby provide further increased resistance to splitting.